

CLAIMS

1. A personal identification method for identifying a user by projecting an objective beam and a reference beam subjected to spatial light modulation in accordance with information to be recorded onto a holographic recording portion of an optical information recording medium having the holographic recording portion to record the information by interference fringes, and projecting a reproduction reference beam onto the interference fringes to reproduce the object beam, the method comprising:

subjecting the reference beam to the spatial light modulation by record cryptographic identification information based on biometric information of the user when recording the information, and subjecting the reproduction reference beam to the spatial light modulation by validation cryptographic identification information based on biometric information directly obtained from the user when reproducing the information.

2. The personal identification method according to claim 1, wherein

imaging the biometric information by a predetermined encoding scheme forms the record cryptographic identification information and the validation cryptographic identification information, and this image is used as a modulation pattern of the reference beam and the reproduction reference beam.

3. The personal identification method according to claim 2, wherein the encoding scheme comprises the steps of:

dividing an original image displaying the biometric information into a plurality of pixel blocks, said pixel

5 blocks being composed of a plurality of and the same number of pixels, and detecting the number of ON pixels or OFF pixels in each pixel block; and

converting the pixels of every pixel block into conversion pixel patterns predetermined on the number of ON
10 pixels or OFF pixels basis in accordance with the detected number in order to provide a bitmap image indicating the record cryptographic identification information and the validation cryptographic identification information.

4. The personal identification method according to claim
15 3, wherein

the pixel block is composed of an even number equal to or more than six of pixels, and the conversion pixel pattern has the same number of ON pixels and OFF pixels.

5. The personal identification method according to any
20 one of claims 1 to 4, wherein

the reference beam and the reproduction reference beam are subjected to phase spatial light modulation.

6. A personal identification system comprising:

an optical information recording medium having a
25 holographic recording portion in which a hologram is formed,

the hologram being formed by interference fringes when a reference beam subjected to spatial light modulation by record cryptographic identification information based on biometric information of a user and an object beam subjected to spatial light modulation in accordance with information to be recorded are projected;

a biological information sensor that can directly obtain the biometric information from the user;

an information processing device for using the biometric information obtained by the biological information sensor as validation cryptographic identification information;

a reproduction optical system for projecting a reproduction reference beam similar to the reference beam at the time of recording to the holographic recording portion in order to reproduce the recorded information by generated diffracted light;

a spatial light modulator for modulating the reproduction reference beam by the validation cryptographic identification information; and

a calculation device for verifying an identity of the user on the basis of the information reproduced by the reproduction optical system and outputting a signal allowing or refusing the user by a validation result.

7. The personal identification system according to claim

6,

further comprising:

a hardware for allowing or refusing the user in response to the allowing or refusing signal from the calculation device.

8. The personal identification system according to claim

5 6, wherein:

a client server is provided with the biological information sensor, the information processing device, the reproduction optical system, and the spatial light modulator; a host server is provided with the calculation device; the
10 client server and the host server are connected by a circuit; the client server outputs the reproduced personal identification information; and the host server outputs the allowing or refusing signal.

9. The personal identification system according to claim

15 7, wherein:

a client server is provided with the biological information sensor, the information processing device, the reproduction optical system, and the spatial light modulator; a host server is provided with the calculation device; the
20 client server and the host server are connected by a circuit; the client server outputs the reproduced personal identification information; and the host server outputs the allowing or refusing signal.

10. The personal identification system according to any

25 one of claims 6 to 9, wherein

the record cryptographic information and the validation cryptographic information are modulation patterns of the biometric information by imaging the biometric information by a predetermined encoding scheme.

5 11. The personal identification system according to claim 10, wherein

the record cryptographic information and the validation cryptographic information is bitmap images formed by dividing original images displaying the biometric information into a
10 plurality of pixel blocks composed of a plurality of and the same number of pixels, detecting the number of ON pixels or OFF pixels in each pixel block, and converting the pixels of every pixel block into conversion pixel patterns predetermined on the number of ON pixels or OFF pixels basis in accordance
15 with the detected number.

12. The personal identification system according to claim 11, wherein

the pixel block is composed of an even number equal to or more than six of pixels, and the conversion pixel pattern has
20 the same number of ON pixels and OFF pixels.

13. The personal identification system according to any one of claims 6 to 9, wherein

the hologram is interference fringes between the object beam and the reference beam subjected to the phase spatial
25 light modulation.

14. The personal identification system according to claim
10, wherein

the hologram is interference fringes between the object
beam and the reference beam subjected to the phase spatial
5 light modulation.

15. The personal identification system according to claim
12, wherein

the hologram is interference fringes between the object
beam and the reference beam subjected to the phase spatial
10 light modulation.

16. An optical information recording medium comprising: a
holographic recording portion in which a hologram is formed,
the hologram being formed by interference fringes when a
reference beam subjected to spatial light modulation by record
15 cryptographic identification information based on biometric
information of a user and an object beam subjected to spatial
light modulation in accordance with information to be recorded
are projected.

17. The optical information recording medium according to
20 claim 16, wherein

the record cryptographic information is modulation
patterns of the biometric information by imaging the biometric
information by a predetermined encoding scheme.

18. The optical information recording medium according to
25 claim 17, wherein

the record cryptographic information is bitmap images formed by dividing original images displaying the biometric information into a plurality of pixel blocks composed of a plurality of and the same number of pixels, detecting the
5 number of ON pixels or OFF pixels in each pixel block, and converting the pixels of every pixel block into conversion pixel patterns predetermined on the number of ON pixels or OFF pixels basis in accordance with the detected number.

19. The optical information recording medium according to
10 claim 18, wherein

the pixel block is composed of an even number equal to or more than six of pixels, and the conversion pixel pattern has the same number of ON pixels and OFF pixels.

20. The optical information recording medium according to
15 any one of claims 16 to 19, wherein

the hologram is interference fringes between the object beam and the reference beam subjected to the phase spatial light modulation.